REMARKS

Applicant respectfully requests allowance of the subject application. Claims 1-44 and 55-63 are pending. In view of the following remarks, Applicant respectfully requests that the rejections be withdrawn and the application be forwarded along to issuance

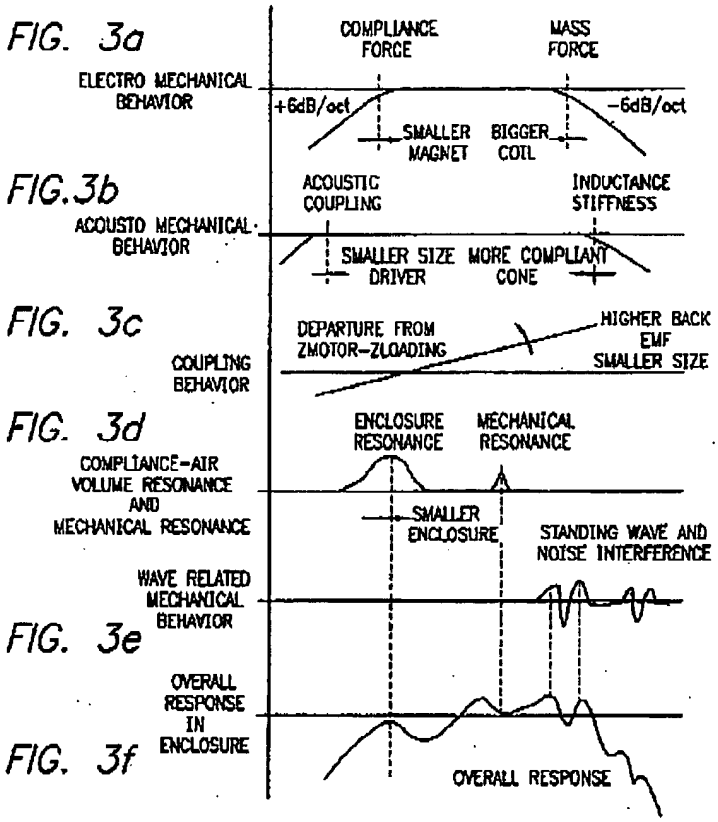
§ 112, First Paragraph Rejection

Claims 13, 37 and 55 are rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. The Applicant respectfully disagrees.

Regarding **Claims 13** and **37**, the Office asserts that the features "another said filter simulating the enclosure" and "another said filter simulates the enclosure" of these claims, respectively, "are not described in the specification in such as way as to reasonable convey to one skill in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention". *See Office Action Dated June 16, 2005, Page 2.* This is not the case.

As previous described, support for this feature may be found throughout the specification and drawings as filed, such as through pages 12-14, e.g., "each of these computed and adjustable compensation responses can be scaled to a parametrically variable, feature, or design aspect, relating to size, a moving property, or acoustic radiation behavior, amongst other things" and "instead of compiling or reducing speaker elements to create a lumped response system, the compensation system uses minimum-phase equivalence and string of non-interacting filters. *See Application, Pages 12 and 13, respectively.*

A plurality of such response components which may be modeled using the non-interacting filters may be found in relation to FIGS. 3a-3e. The response components are combined to form the overall response shown in FIG. 3f. These figures are excerpted as follows for the sake of convenience.



Thus, as shown in the above FIGS. 3a-3f and as described in the specification, "Figures 3a-3e shows a plurality of individual responses related to speaker components which combine to produce the overall response curve". *See Application, Page 13, Lines 7-9.* As is apparent from the figure, enclosure resonance is one such individual response related to a speaker component (e.g., the enclosure) which is combinable to define an overall response for a sonic

reproduction device as recited in Claims 13 and 37. Another such example may be found in relation to FIG. B1. Thus, it is readily apparent when viewing these figures and upon reading the accompanying discussion that the Applicant was in possession of the claimed invention when the Application was filed.

Accordingly, since this is the only rejection offered by the Office in respect to Claims 13 and 37, withdrawal of the rejection under § 112, first paragraph is respectfully requested and allowance of Claims 13 and 37, as well as Claims 14-18 and 38-44 which depend from these claims respectively, is also respectfully requested.

Claim 55 was also rejected as failing to comply with the written description requirement. In particular, the Office asserts that "at least one said filter, which corresponds to an individual component of the sonic reproduction device, is replaceable with another filter in response to replacement of the individual component of the sonic reproduction device with another individual component, wherein the other filter simulates a behavioral characteristic of the other individual component" is not supported by the specification or drawings. *See Office Action Dated June 16, 2005, Page 3.* The Applicant respectfully disagrees.

Beginning at page 1 of the subject Application, the Applicant describes characteristics of traditional functional or behavioral models of loudspeakers used to develop compensations. Most often, the transformed electromechanical, acoustic, and mechanical representations expressed in the model are further simplified or reduced to fewer elements. Consequently, traditional models are neither intended, nor capable of making parametrically addressed zero-phase compensations when speaker parts are changed. *See Application, Pages 2-3.*

In the present Application, however, the behavioral characteristics may be defined by individual or groups of individual components of the sonic reproduction device. *See Application, Page 8.* Instead of compiling or reducing speaker elements to create a lumped response system, the compensation system uses minimum-phase equivalence and strings of non-interacting filters. *See Application, Page 13.* By modeling the production device's individual components and the characteristics of those components or groups of components, individual compensations for these characteristics can be created and manipulated parametrically. *See Application, Page 8.* Therefore, these same compensations can be applied to additional systems having similar components or characteristics. *Id.* Thus, the present Application provides support for a compensation system that addresses the changing of speaker parts through strings of non-interacting filters, such that, a filter may be changed when its respective component is changed.

Accordingly, since this is the only rejection offered by the Office in respect to Claim 55, withdrawal of the rejection under § 112, first paragraph is respectfully requested and allowance of Claim 55, as well as Claims 56-63 which depend from this claim is also respectfully requested.

§§ 102(b) and 103 Rejections

Claims 1-3, 5, 6, 29, 30 and 32 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,815,585 to Klippel (hereinafter "Klippel"). Claims 4, 7, 8, 17, 31 and 33 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Klippel. Claims 9, 10 and 34 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Klippel in view of U.S. Patent No. 4,223,181 to Simeau (hereinafter "Simeau"). Claims 11, 12, 35 and 36 stand rejected under 35

U.S.C. § 103(a) as being unpatentable over Klippel in view of U.S. Patent No. 6,295,364 to Finn et al. (hereinafter "Finn").

The References

Klippel describes a detector circuit which derives a motional signal of a transducer (displacement, velocity, acceleration) by sensing terminal voltage and input current of the transducer only. The motional signal is used for adjusting an adaptive correction filter to compensate for the distortions of the transducer and to produce a desired transfer characteristic of the overall system. *See Klippel, Col. 3, Lines 38-44.* The main purpose of the invention of Klippel is to omit an additional acoustic or mechanic sensor which is expensive and affects the efficiency of the distortion reduction. *See Klippel, Col. 3, Lines 45-50.*

This purpose is purportedly reached in Klippel by connecting a detector circuit between the output of the correction filter and the terminals of the transducer. *See Klippel, Col. 3, Line 60 to Col. 4, Line 2.* The detector circuit produces a motional signal (e.g. velocity) of the voice coil by modeling the electric input circuit of the transducer. The detector circuit is adaptive and determines the unknown model parameter (resistance and inductance of the voice coil, force factor B1) from the sensed motional signal on-line. A nonlinear subsystem compensates for the effect of the displacement varying force factor. The structure of the circuits and their connection is directly derived from a lumped parameter model of the electrodynamic transducer. *See Klippel, Col. 5, Lines 10-13.*

Simeau describes a signal processing device for audio frequency noise reduction. *See Simeau, Col. 1, Lines 9-10.* The signal processing device has an

error channel which carries complimentary spectra signals, and a main channel which carries the other complimentary spectra signal. The transmission characteristics of the main channel are controlled by the signal carried by the error channel which controls the transition frequency. *See Simeau, Col. 2, Lines 39-45.*

Finn describes a simplified communication system that has first and second acoustic zones, and respective microphones and loudspeakers. First and second noise sensitive bandpass filters and first and second equalization filters are provided in the first and second channels, respectively. Each equalization filter reduces resonance peaks in the acoustic transfer function between the receiving loudspeaker in the other zone and the sending microphone in the one zone to reduce feedback by damping resonance peaks.

The Claims

Claim 1 recites an apparatus for modifying an electrical audio signal for input to a sonic reproduction device that includes a speaker characterized by a plurality of individual responses which in combination define an overall response for the sonic reproduction device which includes frequency, time, phase and transient response, said apparatus comprising:

- a plurality of modification filters having modification responses that simulate the plurality of individual responses, at least one said modification filter simulating an individual component of the speaker, the modification filters for receiving the electrical audio signal, modifying the electrical audio signal and providing the electrical audio signal to the sonic reproduction device; and
- a plurality of adjustable parameters, each associated with at least one of the modification filters for allowing adjustments to the responses of the modification filters;

- wherein the adjustments create a plurality of individual conjugate responses, each individual conjugate response associated with at least one of the plurality of individual responses.

Neither Klippel, nor any of the other submitted references, alone or in combination, disclose, teach, nor suggest "a plurality of individual responses which in combination define an overall response for the sonic reproduction device which includes frequency, time, phase and transient response" as claimed in claim 1.

The Office asserts the following portion of Klippel at FIG. 2, filters 19-23 and Col. 5, lines 5-19 as disclosing a "motional signal which will inherently have a mechanical frequency, times, phase and transient response". *See Office Action Dated June 16, 2005, Page 3.*

> The circuits 19-23 and the summers 24-27 are used to estimate the motional signal v(t) from both electric signals i(t) and u_L (t). Every circuit 19-23 has one signal input 33-37, one signal output 43-47 and one additional input 38-42 for the error signal. Every summer 24-27 has two signal inputs and one signal output. The structure of the circuits 19-23 and their connection is directly derived from the lumped parameter model of the electrodynamic transducer. The electric input circuit in the lumped parameter model comprises the series connection of the resistance R_e, the inductance L_e of the voice coil and the electrodynamic transformer. The electrodynamic transformer is defined by the force factor B_L (X) which depends on the displacement x(t) of the voice coil and couples the back-induced voltage u(t) with the velocity v(t) of the voice coil by the relationship u(t)=B_L (x)v(t) (2). *Klippel, Col. 5, Lines 5-20.*

It is respectfully submitted that the above excerpted portion merely described a lumped-parameter model and does not disclose "plurality of individual responses which in combination define an overall response for the sonic reproduction device

which includes frequency, time, phase and transient response" as recited in Claim 1. Indeed, Klippel does not even include the words "phase" or "transient response". Accordingly, for at least these reasons, this claim is allowable and withdrawal of the rejection is respectfully requested.

Claims 2-12 depend either directly or indirectly from claim 1 and are allowable as depending from an allowable base claim. These claims are also allowable for their own recited features which, in combination with those recited in claim 1, are neither shown nor suggested in the references of record, either singly or in combination with one another.

Claim 29 recites a sound system comprising:

- a sonic reproduction device having associated mechanical, acoustic and electromagnetic behavioral characteristics;
- a source for outputting an electrical audio signal to a model of the sonic reproduction device, the model having a plurality of filters that simulate at least one of the mechanical, acoustic and electromagnetic behavioral characteristics of the sonic reproduction device, at least one said filter simulating an individual component of a speaker of the sonic reproduction device, the plurality of filters providing an overall response of the sonic reproduction device that includes frequency, time, phase and transient response, the model outputting the electrical audio signal to the sonic reproduction device; and
- a controller that modifies the responses of the filters to transform the model into a conjugate model having a plurality of filters with responses that comprise conjugates to the original response of the filter.

Klippel does not disclose these aspects.

For example, Klippel does not disclose a "plurality of filters providing an overall response of the sonic reproduction device that includes frequency, time, phase and transient response" as claimed in claim 29. The Office in this instance (as opposed to Claim 1) asserts a different section of Klippel for this feature, which is excerpted as follows:

> Every parameter n_0, r, l, n_1, n_2 in Eqs. (10) and (11) corresponds with one of the adaptive circuits 19-23. Circuit 19 corresponds with the first term on the right side of Eq. (11) and multiplies the terminal voltage u_L (t), supplied from output 32 via input 33 by parameter n_0. The circuit 20 corresponds with the effect of the voice coil resistance in the second term in Eq. (11) and multiplies the input current i(t) supplied from output 31 via input 34 by parameter r. The circuit 21 corresponds with the inductance of the voice coil according to the third term in Eq. (11). The current signal i(t) supplied via input 35 from output 31 is first differentiated and then multiplied by parameter l. The signals at the outputs 43, 44, 45 of the circuits 19, 20, 21 are summed up to the signal w(t) by summers 24 and 25.

However, this section does not disclose "frequency, time, phase and transient response" as recited in Claim 29. Indeed, nowhere in the entire text of Klippel is "phase" or "transient response" even mentioned. Accordingly, for at least these reasons, Claim 29 is allowable and withdrawal of the rejection is respectfully requested.

Claims 30-36 depend either directly or indirectly from claim 29 and are allowable as depending from an allowable base claim. These claims are also allowable for their own recited features which, in combination with those recited in claim 29, are neither shown nor suggested in the references of record, either singly or in combination with one another.

For example, **Claim 33,** as well as **Claims 7** and **8**, are rejected as being obvious over Klippel. The Office correctly asserted that Klippel "does not explicitly disclose cut-off filters". *See Office Action Dated June 16, 2005, Page 6.* However, the Office then incorrectly asserts that "the filters will have a cut-off frequency at some values in order to modify the audio signal" as well is "It is well known in the art the center frequency of a filter is related to the Q factor by

$Q=f_0/BW$ where f_0 is the center frequency and BW is the bandwidth". *See Office Action Dated June 16, 2005, Page 6.* This is not the case.

Beginning at page 22 of the subject application, an exemplary cutoff filters are described. For example Sallen and Key circuits can make active high-pass and low-pass filters with adjustable peaking responses. Figure 9 shows the two filters configured to a single op amp. Mid-band response is flat and cutoff slopes are + and – 18dB per octave. Peaking amplitude of L_p and H_p are adjustable and correspond to FIG. 4b. *See Application, Page 22 and FIGS. 4B and 9.* Klippel, therefore, does not teach or suggest a cut-off filter.

Accordingly, for at least these reasons, Claims 7, 8 and 33 are allowable and withdrawal of the rejection is respectfully requested.

Conclusion

All of the claims are in condition for allowance. Accordingly, Applicant requests a Notice of Allowability be issued forthwith. If the Office's next anticipated action is to be anything other than issuance of a Notice of Allowability, Applicant respectfully requests a telephone call for the purpose of scheduling an interview.

Respectfully Submitted,

Dated: July 27th, 2005 By: _____

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